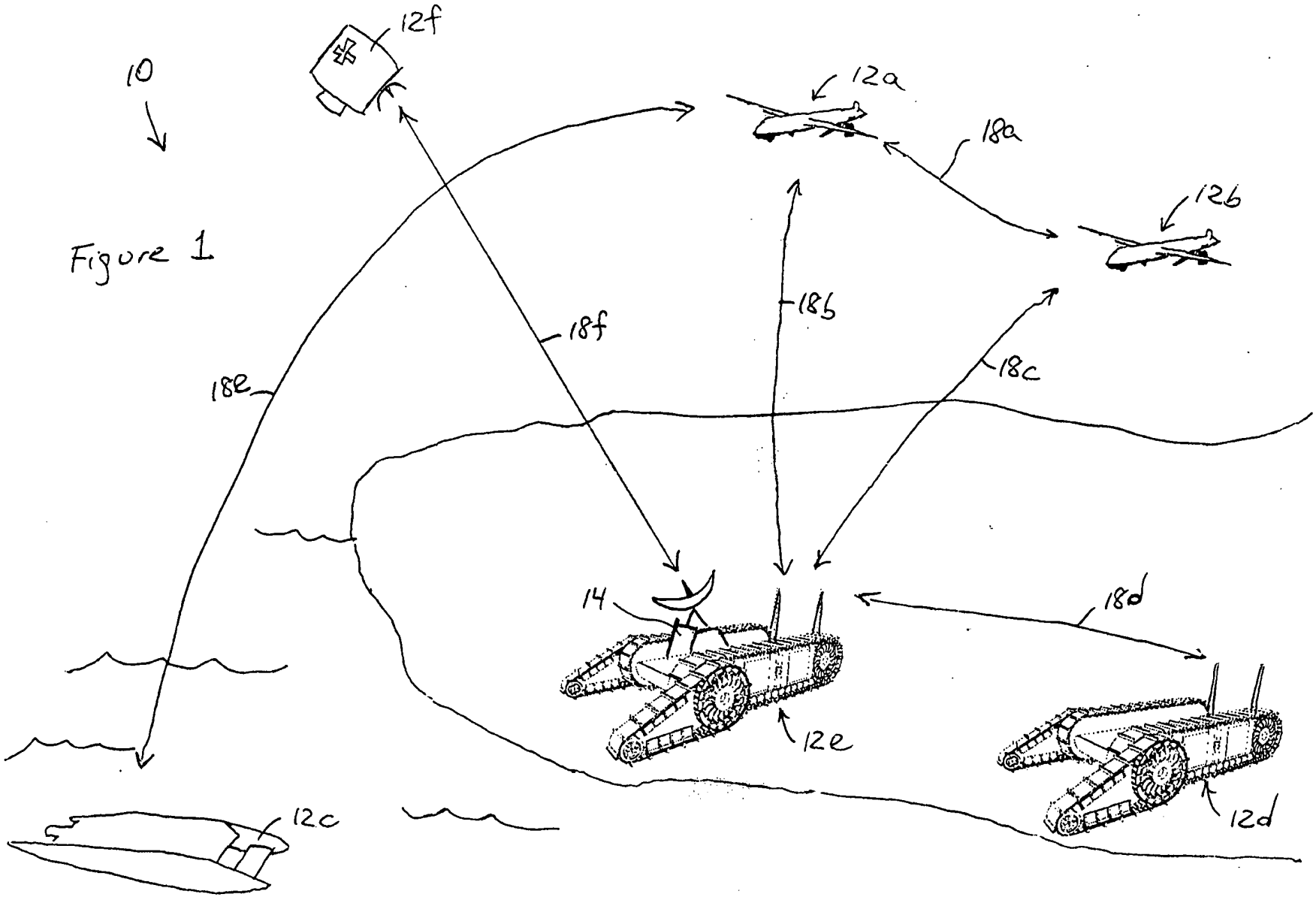


Figure 1

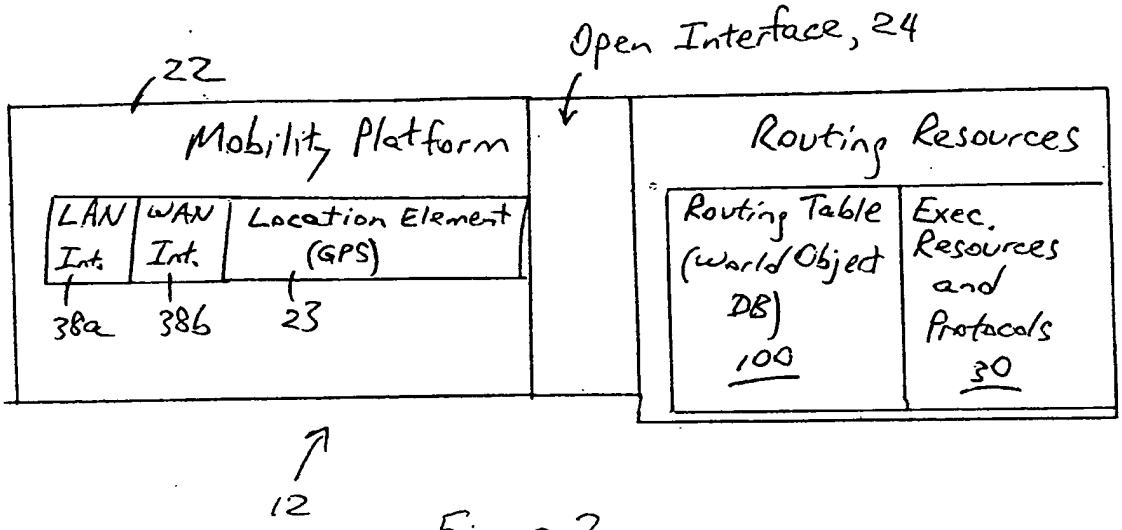

Open Interface, 24
22
Mobility Platform
LAN Int.
WAN Int.
Location Element (GPS)
38a
38b
23
Routing Resources
Routing Table (World Object DB)
100
Exec. Resources and Protocols
30
12

Figure 2

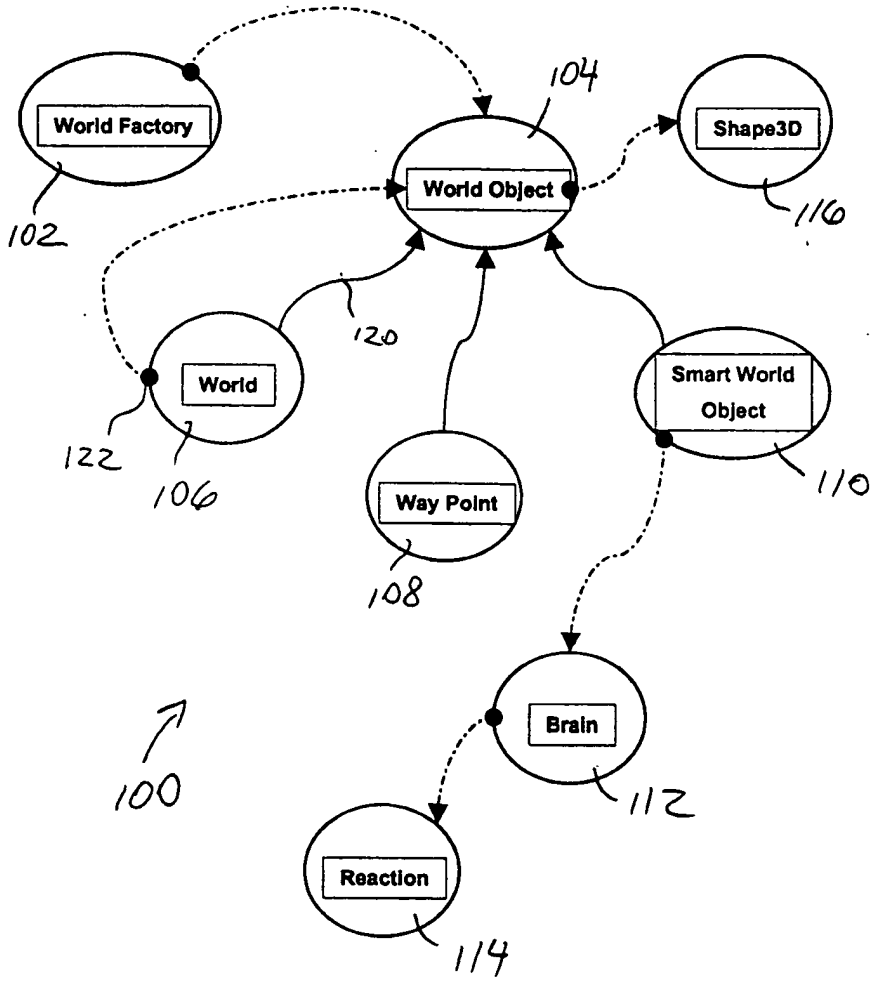

World Factory
102
104
World Object
Shape3D
116
120
World
122
106
Smart World Object
110
Way Point
108
100
Brain
112
Reaction
114

Figure 3

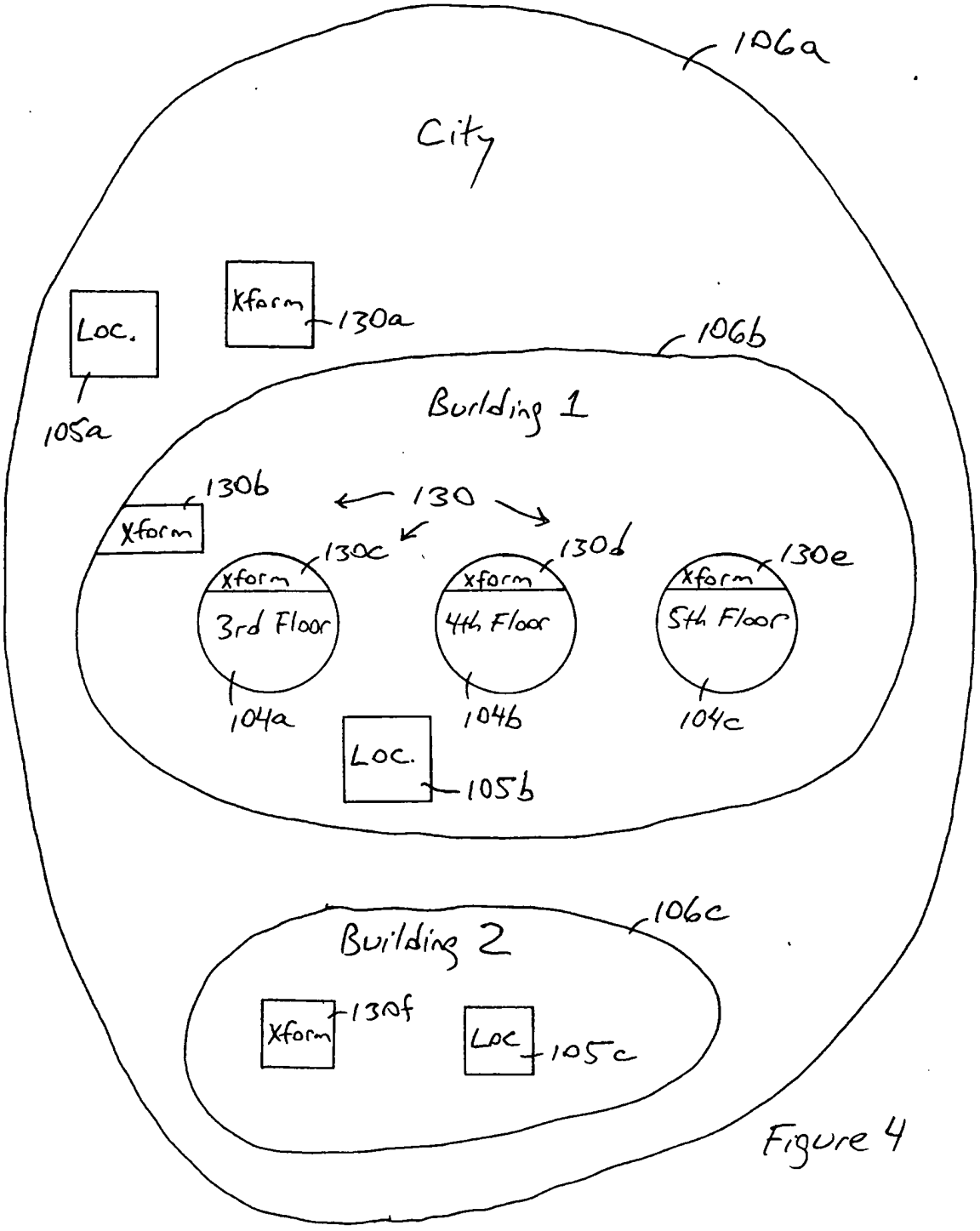

106a
City
Loc.
105a
Xform
130a
106b
Building 1
130b
Xform
130
130c
Xform
3rd Floor
104a
130d
Xform
4th Floor
104b
130e
Xform
5th Floor
104c
Loc.
105b
106c
Building 2
Xform
130f
Loc
105c

Figure 4

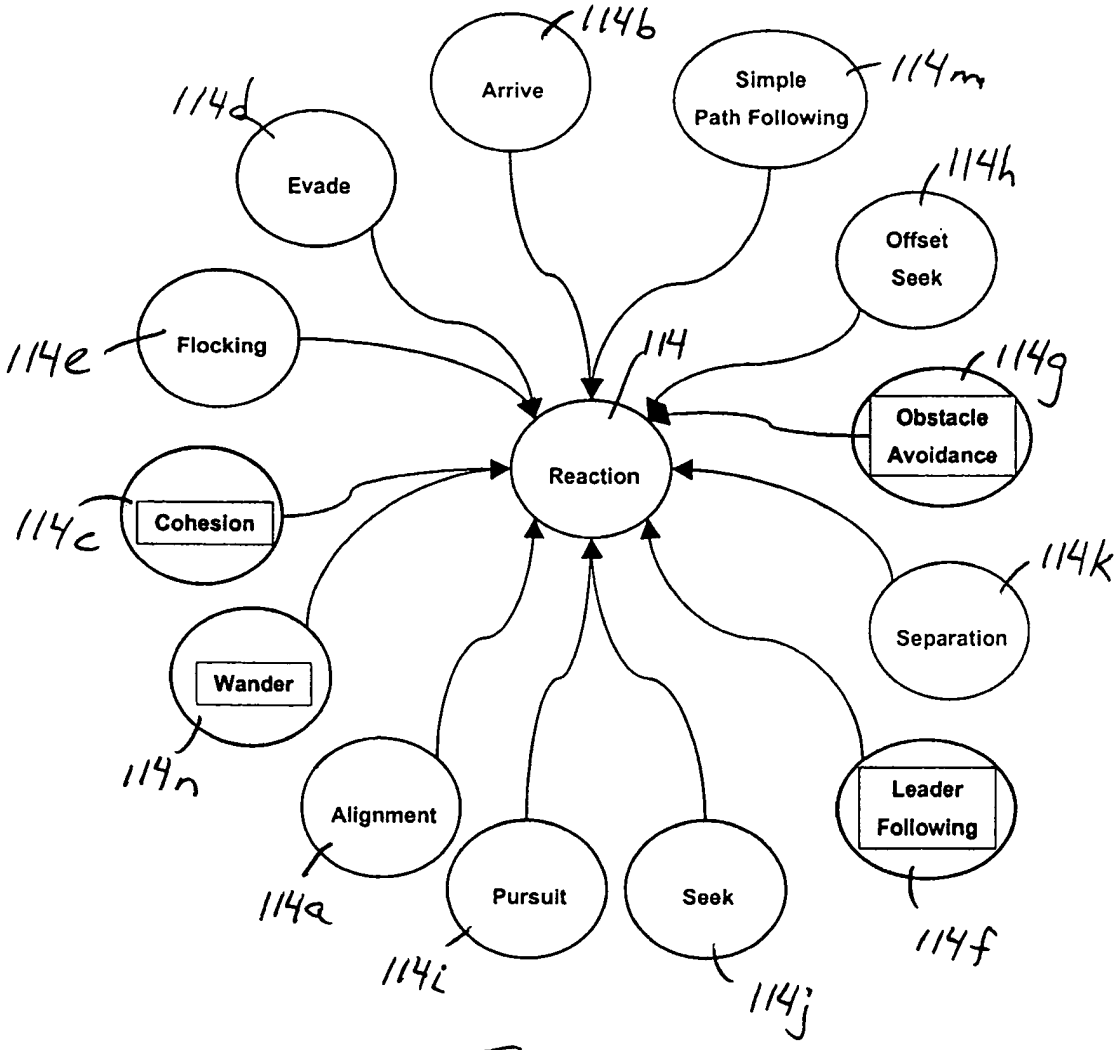

Arrive
114b
Simple
Path Following
114m
114d
Evade
114h
Offset
Seek
Flocking
114e
114
114g
Obstacle
Avoidance
Reaction
Cohesion
114c
114k
Separation
Wander
114n
Alignment
Leader
Following
114a
Pursuit
Seek
114f
114i
114j

Figure 5

ved.

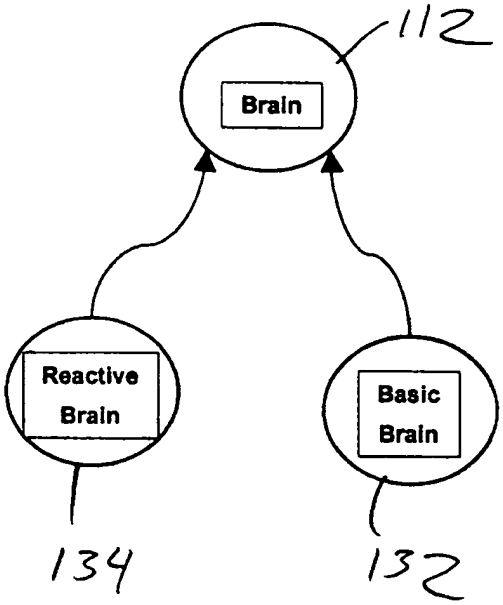


Figure 6

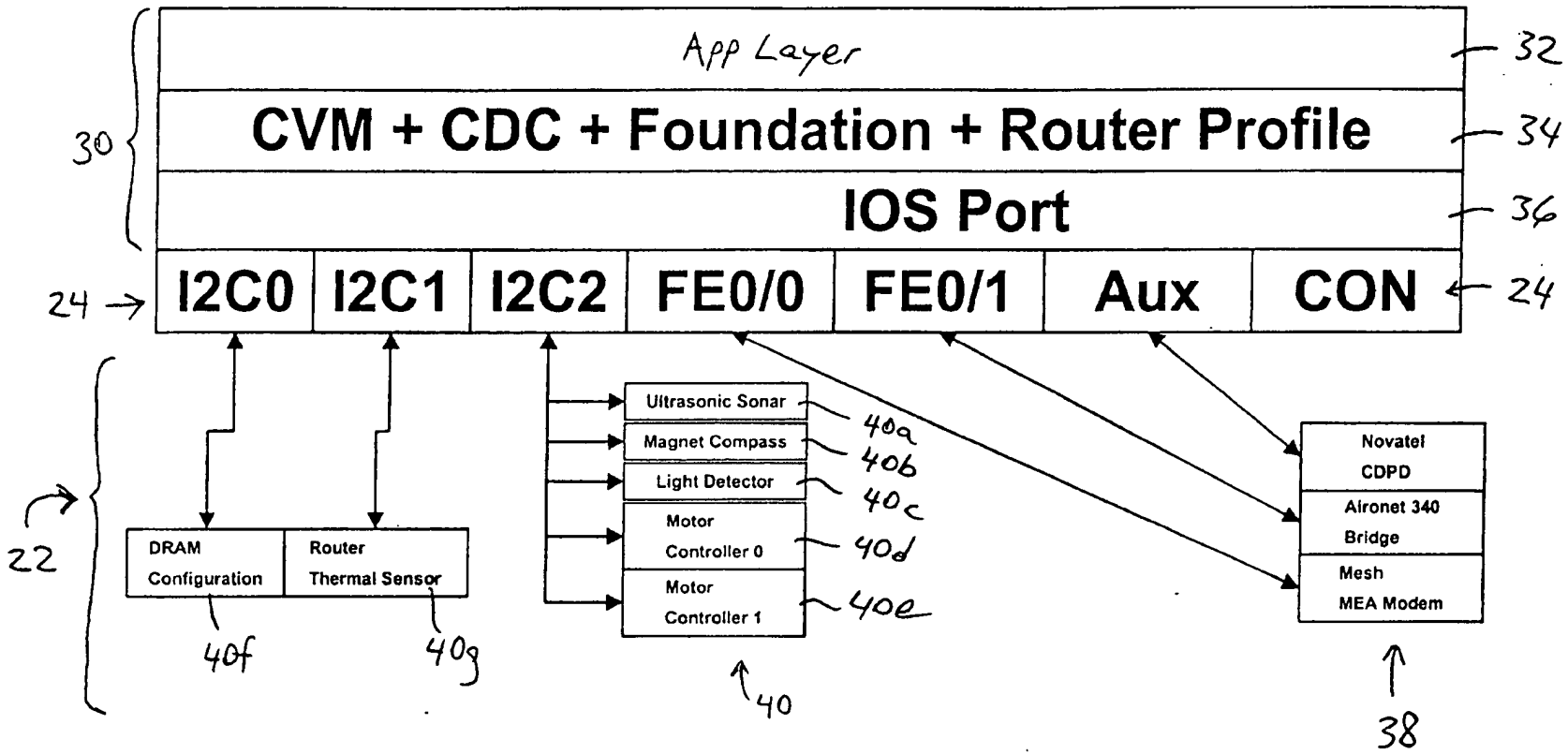

App Layer
32
30
CVM + CDC + Foundation + Router Profile
34
IOS Port
36
24
I2C0
I2C1
I2C2
FE0/0
FE0/1
Aux
CON
24
Ultrasonic Sonar
40a
Magnet Compass
40b
Light Detector
40c
Motor Controller 0
40d
Motor Controller 1
40e
Novatel CDPD
Aironet 340 Bridge
Mesh MEA Modem
22
DRAM Configuration
Router Thermal Sensor
40f
40g
40
38

Figure 7

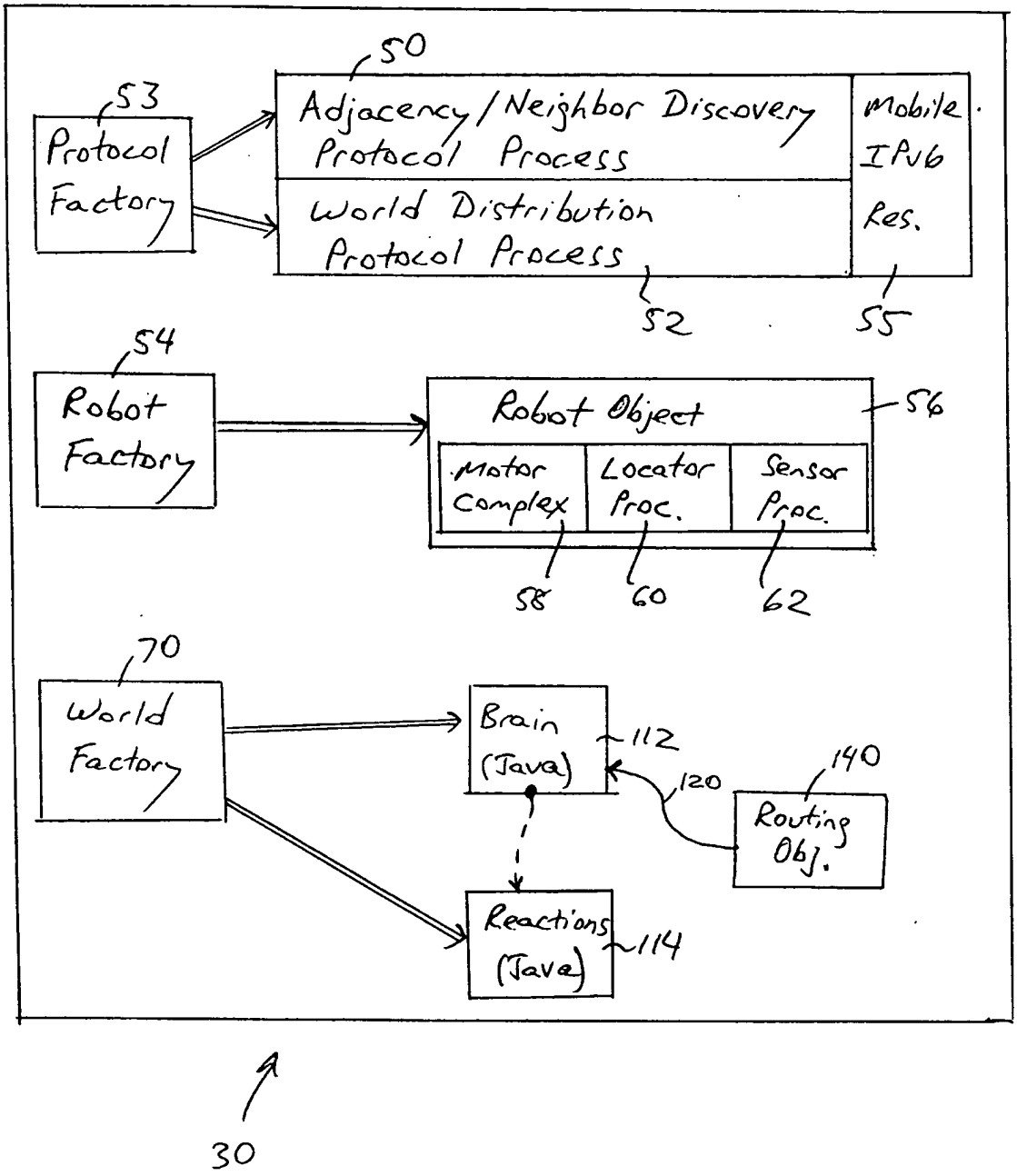

50
53
Protocol Factory
Adjacency / Neighbor Discovery Protocol Process
World Distribution Protocol Process
Mobile IPv6 Res.
52
55
54
Robot Factory
Robot Object
56
Motor Complex
Locator Proc.
Sensor Proc.
58
60
62
70
World Factory
Brain (Java)
112
120
140
Routing Obj.
Reactions (Java)
114
30

Figure 8

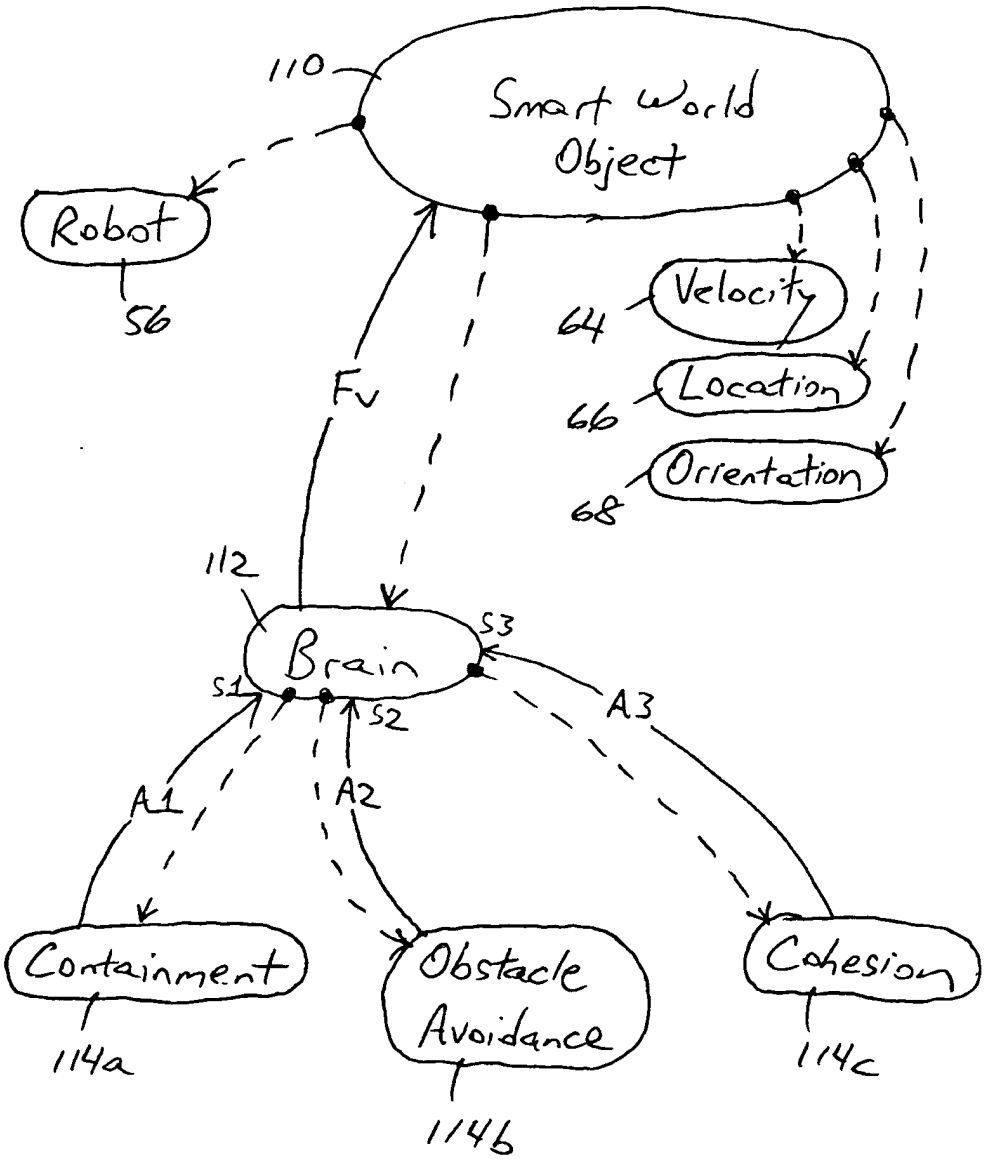
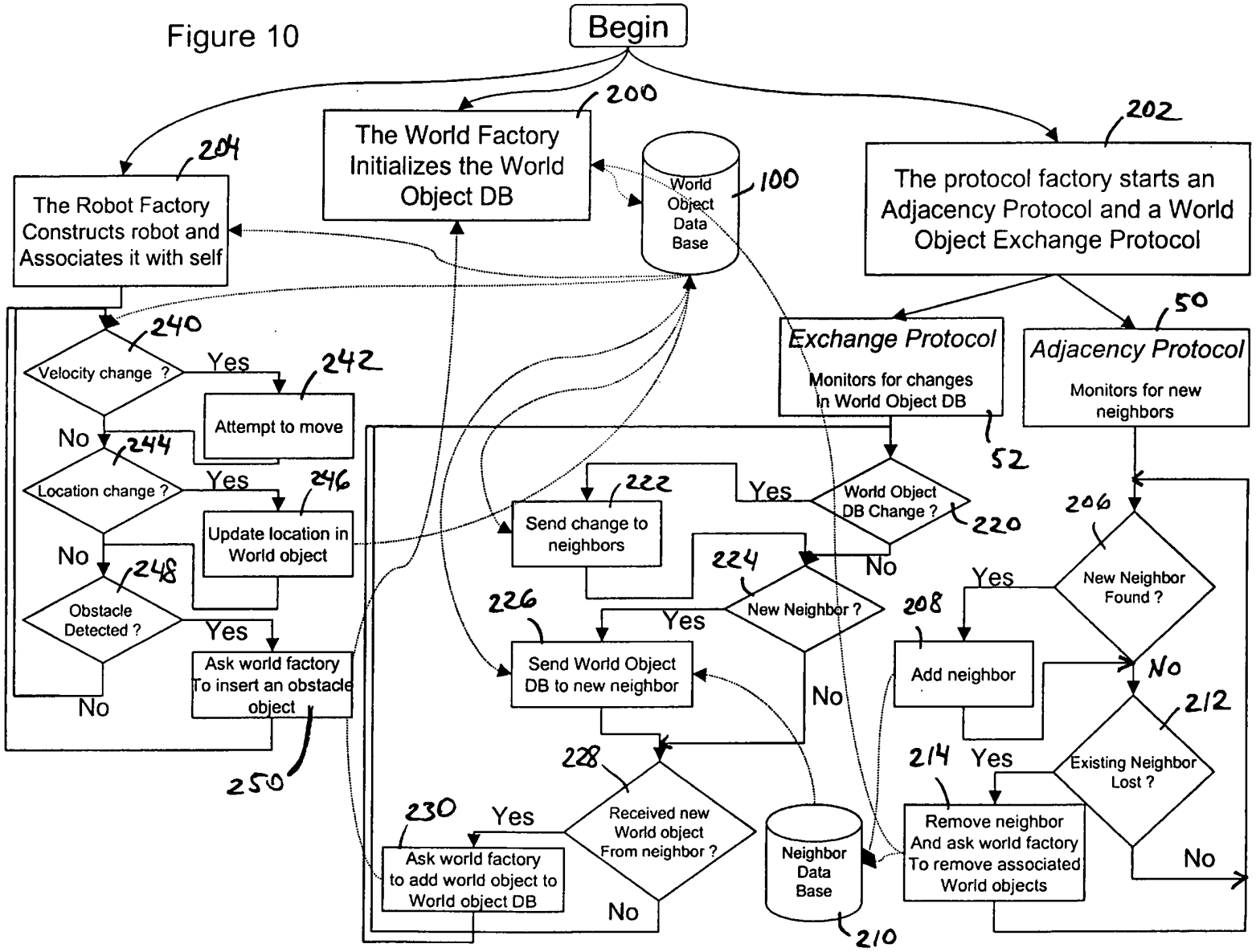

110
Smart World Object
Robot
56
Velocity
64
Location
66
Orientation
68
Fv
112
Brain
S1
S2
S3
A1
A2
A3
Containment
114a
Obstacle Avoidance
114b
Cohesion
114c

Figure 9

Figure 10


Begin
200
The World Factory Initializes the World Object DB
World Object Data Base
100
202
The protocol factory starts an Adjacency Protocol and a World Object Exchange Protocol
204
The Robot Factory Constructs robot and Associates it with self
Exchange Protocol
Monitors for changes in World Object DB
52
Adjacency Protocol
Monitors for new neighbors
50
240
Velocity change ?
Yes
242
Attempt to move
No
244
Location change ?
Yes
246
Update location in World object
No
248
Obstacle Detected ?
Yes
Ask world factory To insert an obstacle object
No
250
222
Send change to neighbors
Yes
World Object DB Change ?
220
No
224
New Neighbor ?
Yes
226
Send World Object DB to new neighbor
No
228
Received new World object From neighbor ?
230
Yes
Ask world factory to add world object to World object DB
No
Neighbor Data Base
210
206
New Neighbor Found ?
Yes
208
Add neighbor
No
212
214
Existing Neighbor Lost ?
Yes
Remove neighbor And ask world factory To remove associated World objects
No